

Abstract for Proposed Panel, “ Multilateral Research Opportunities in Ground Analogs,” in Topic Area “Analog Environments,” 20th Humans in Space Symposium, IAA, Prague, June 2015

Coordination of international risk-reduction investigations by the Multilateral Human Research Panel for Exploration

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Effective use of the unique capabilities of the International Space Station (ISS) for risk reduction on future deep space missions involves preliminary work in analog environments to identify and evaluate the most promising techniques, interventions and treatments. This entails a consolidated multinational approach to biomedical research both on ISS and in ground analogs. The Multilateral Human Research Panel for Exploration (MHRPE) was chartered by the five ISS partners to recommend the best combination of partner investigations on ISS for risk reduction in the relatively short time available for ISS utilization. MHRPE will also make recommendations to funding agencies for appropriate preparatory analog work.

In 2011, NASA's Human Research Program (HRP) and the Institute of Biomedical Problems (IBMP) of the Russian Academy of Science, acting for MHRPE, developed a joint US-Russian biomedical program for the 2015 one-year ISS mission (1YM) of American and Russian crewmembers. This was to evaluate the possibilities for multilateral research on ISS. An overlapping list of 16 HRP, 9 IBMP, 3 Japanese, 3 European and 1 Canadian investigations were selected to address risk-reduction goals in 7 categories: Functional Performance, Behavioral Health, Visual Impairment, Metabolism, Physical Capacity, Microbial and Human Factors.

MHRPE intends to build on this bilateral foundation to recommend more fully-integrated multilateral investigations on future ISS missions commencing after the 1YM. MHRPE has also endorsed an on-going program of coordinated research on 6-month, one-year and 6-week missions ISS expeditions that is now under consideration by ISS managers. Preparatory work for these missions will require coordinated and collaborative campaigns especially in the psychological and psychosocial areas using analog isolation facilities in Houston, Köln and Moscow, and possibly elsewhere. The multilateral Human Analogs research working group (HANA) is the focal point of those planning discussions, with MHRPE coordinating between the national programs and then supporting implementation on ISS.

Experience gained during preparations for the 1YM has identified improvements in both American and Russian processes to enable well-integrated investigations on all subsequent ISS expeditions. Among those is that the greatest efficiency is to be gained with investigations that are fully integrated from their conception, with co-principal investigators, a consolidated proposal and integrated plans for crewmember time and other flight-related resources. Analog investigations preceding future ISS expeditions will employ these lessons in efficiency to evaluate the techniques and tools to be validated aboard ISS. In this way, the resources and capabilities of ISS can be applied most efficiently to solving the problems facing astronauts of all nations in missions deep into the solar system.